



eBook

# Crack the Digital Twin Code: The IT Blueprint for Real-Time Operations

How IT leaders can build the data foundation for a new era  
of supply chain efficiency and resilience

Where data  
& AI come to **LIFE**

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# The Hero's Challenge

**Digital twins are no longer hype. They are a competitive necessity, powering a market set to explode past \$149 billion by 2030.<sup>1</sup>**

Yet, a frustratingly high number of these projects get stuck in pilot purgatory, never scaling to deliver on their initial promise. The concept isn't flawed. The data foundation is.

For IT leaders, this isn't just another business "ask" dropped on your desk. This is a monumental opportunity to shift from a support function to the strategic enabler of the business. By architecting the data foundation — the IT blueprint — you become the hero who unlocks real-time operations and strengthens supply chain resiliency and efficiency and delivering tangible business value.

This eBook provides the clear, actionable blueprint you need to build that modern, governed data foundation and ensure your digital twin projects succeed at scale — from supply chain networks to production lines.

<sup>1</sup> <https://www.marketsandmarkets.com/Market-Reports/digital-twin-market-225269522.html>



## Chapter 1

# The Digital Twin Imperative and Why Your Business Can't Wait

### The shift has happened.

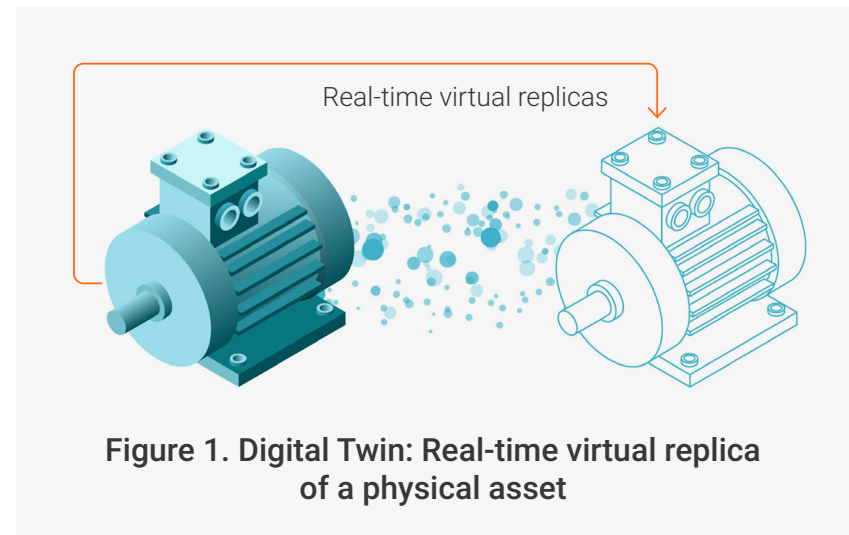
The competitive benchmark for industrial operations has fundamentally changed. The era of reactive problem-solving is over, replaced by a new standard where leaders predict failures, simulate outcomes and optimize processes in real-time. This is no longer a future trend; it's the established industry standard for running an efficient and resilient supply chain.

The question is no longer if an organization needs a digital twin, but how fast it can scale its capabilities to stay competitive.

### So, what exactly is a digital twin?

Forget the jargon. As illustrated in Figure 1, A digital twin is a dynamic, real-time virtual replica of a physical asset, process or system. It uses a continuous stream of data from its real-world counterpart to simulate behavior, predict failures and optimize performance — all within a safe, virtual environment.

This technology represents a fundamental shift in how businesses operate. It's the move from reactive maintenance — fixing things after they break — to predictive operations, where you solve problems before they even happen. This isn't just a technical upgrade; it's a business mandate driven by three core goals:



- **Enhancing Supply Chain Resiliency:** Proactively anticipate and mitigate disruptions before they impact customers.
- **Increasing Operational Efficiency:** Reduce unplanned downtime, optimize production schedules and get more out of your existing assets.
- **Reducing Costs:** Lower maintenance expenses, optimize inventory levels and avoid the high price of operational failures.

## Chapter 2

# The 5 Data Cracks That Break Digital Twins

**A digital twin is only as reliable as the data that feeds it. When the business sees a sleek 3D model, you see the complex web of data pipelines underneath. If that foundation has cracks, the entire structure will eventually collapse.**

This chapter explores the five most common data-related reasons that digital twin projects fail to scale, illustrated with real-world challenges from across the industrial landscape.

### 1. The Data Silo Trap

Your digital twin needs to understand both the physical and the business context of an asset. Without a business context, the twin is flying blind. That means integrating real-time operational technology (OT) data from sensors with enterprise IT data from ERPs and asset management systems.



*For example, a global energy leader faced this exact challenge. Their asset data was fragmented across more than 15 different source systems, from real-time production data to maintenance logs in IBM Maximo. Without a unified view, their twin could only see part of the story, making it impossible to optimize performance across their vast portfolio of power plants.*

### 2. The Quality Crisis

There's a simple rule for digital twins: "Garbage In, Garbage Twin." A twin fed with inconsistent, incomplete or inaccurate sensor data is worse than no twin at all – it's a liability. This leads to flawed insights and erodes business trust.



*Consider a pharmaceutical manufacturer whose digital twin for a bioreactor relies on precise temperature readings. A single, inaccurate data point – caused by a calibration error – could lead the twin to recommend a change that ruins a multi-million-dollar batch of product.*

When a critical decision rests on a sensor reading, that data must be flawless.

## Chapter 2

# The 5 Data Cracks That Break Digital Twins (continued)

### 3. The Fragmented View

The complete story of a single asset is often scattered across a dozen different systems. Without a 360-degree view, optimization is impossible.



*A logistics company wanting to build a digital twin for its delivery fleet found that a truck's GPS location was in one system, its engine telematics in another, its maintenance history in SAP and its cargo manifest in a warehouse database.*

Trying to build a digital twin without first creating a single, 360-degree view of the asset is like building a car with parts from 10 different models. It simply won't work.

### 4. The Scalability Dead End

For a pilot with one or two assets, a few custom, point-to-point integrations might seem like a quick win. But this approach is a dead end. Custom code is brittle and doesn't scale.



*A consumer goods company learned this the hard way. They successfully piloted a digital twin for ten packaging machines, but when they tried to expand to 5,000 machines across 20 global factories, their brittle web of custom integration code collapsed under the sheer volume and variety of data, halting the enterprise-wide rollout for over a year.*

### 5. The Governance Blind Spot

Operational data is sensitive and powerful. Without a framework to govern it, you are exposed to critical risks. Lack of governance creates compliance and business risk.



*For a public utility, proving the lineage of a sensor reading that triggered an operational change is critical for regulatory audits.*

Lacking the ability to govern data and track its lineage doesn't just put the project at risk; it puts the business at risk of significant compliance penalties.

## Chapter 3

# The IT Blueprint: A Modern Data Architecture for Success

Now that we've identified the cracks that can shatter a digital twin initiative, it's time to build a solid foundation. The ultimate goal is to create a single, trusted source of truth for your assets, which requires a unified blueprint built on four essential pillars.

This architecture is delivered by **Informatica's Intelligent Data Management Cloud (IDMC)**, as shown in Figure 2. At its core is **CLAIRE®**, Informatica's enterprise-grade AI engine, which automates and accelerates **data management** tasks across every pillar, providing the stability, scale and trust required for a successful digital twin.

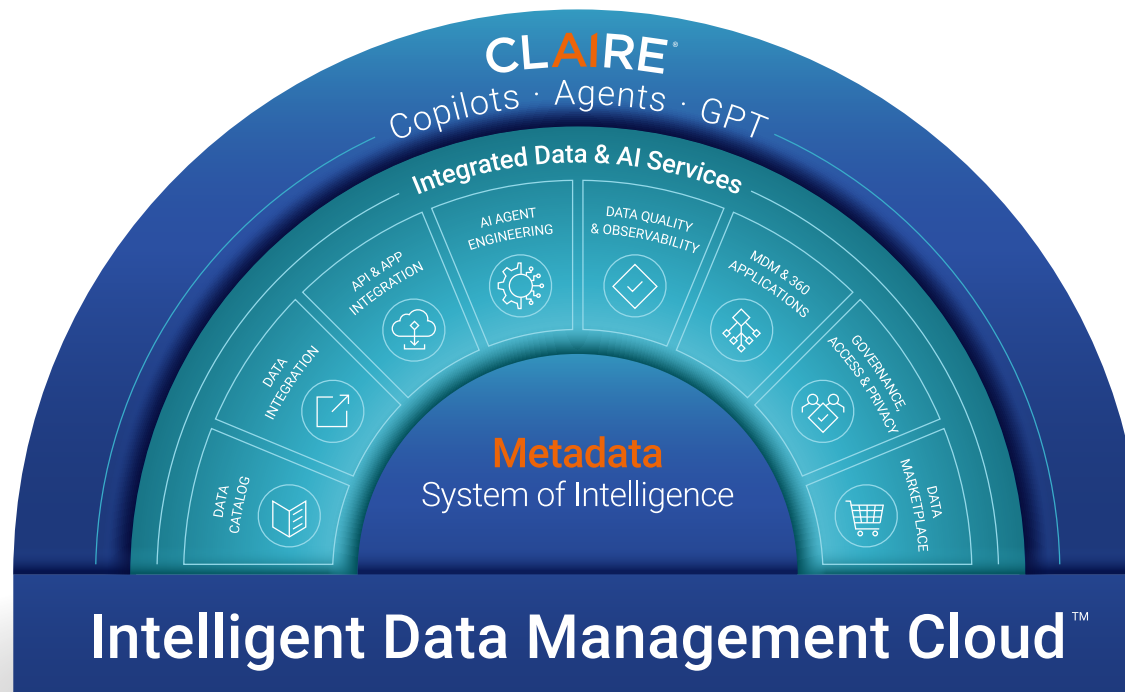


Figure 2. Informatica's Intelligent Data Management Cloud (IDMC)

## Chapter 3

# The IT Blueprint: A Modern Data Architecture for Success (continued)

## 1. Integrate Any Data, Anywhere with Cloud Data Integration

Your digital twin can't operate on an island. It needs a seamless flow of information from every corner of the business. This requires more than just basic connectors; it demands enterprise-grade, scalable integration.

Using **Cloud Data Integration (CDI)**, you can create a powerful data fabric that ingests and synchronizes everything. This isn't just about connecting A to B. It's about:

- **Broad Connectivity:** Break down silos between real-time OT data (from sources like MQTT, Kafka and OPC-UA) and enterprise IT systems like SAP, Oracle and Salesforce by utilizing hundreds of pre-built connectors.
- **High-Performance Processing:** Ensure your digital twin receives data in near real-time by leveraging serverless, elastic Spark processing to handle massive volumes of time-series and sensor data without manual infrastructure management.
- **AI-Powered Automation:** Reduce the manual effort required to build and maintain complex pipelines, accelerating development with AI-driven recommendations for mapping data flows

*This allows the energy leader to connect all 15+ of its disparate OT and IT systems, ensuring the data fabric can handle the velocity and volume required for real-time operations.*

## 2. Create a Trusted Single Source of Truth with MDM & 360 Applications

A digital twin needs one, and only one, version of the truth. **Intelligent Multidomain Master Data Management (MDM)** allows you to build a "golden record" — a single, authoritative, 360-degree view — for every critical business domain, including assets, products and suppliers. This is achieved through a set of core MDM capabilities that work together to deliver decision-ready context for every use case and business process:

- **Connect:** Integrate asset data across ERP, EAM, PLM, IoT and external sources.
- **Master:** Create golden asset and instance records — one shared version of the truth.
- **Resolve:** Match, deduplicate and apply survivorship rules to fix identity conflicts.
- **Clean:** Standardize specifications, units, thresholds and core attributes.
- **Relate:** Maintain hierarchies and rich relationships across the asset ecosystem.
- **Govern:** Manage ownership, stewardship workflows, lifecycle changes and auditability.
- **Activate:** Publish trusted context into twin platforms, analytics, dashboards and AI.

*For the logistics company, this means creating a trusted "Asset 360" view for each truck, combining telematics, maintenance and cargo data to enable true, end-to-end fleet optimization.*

## Chapter 3

# The IT Blueprint: A Modern Data Architecture for Success (continued)

### 3. Achieve High Data Reliability with Cloud Data Quality

To avoid the “Garbage In, Garbage Twin” crisis, you need to guarantee the quality of your data before it ever reaches the twin. By embedding **Cloud Data Quality** into your data pipelines, you can automate this critical function. This is a continuous, automated process that:

- **Automatically Profiles and Discovers Rules:** Discover hidden quality issues, identifying outliers and inconsistencies as CLAIRE automatically scans your data. It can even infer and recommend data quality rules, reducing manual effort.
- **Applies Reusable Rules:** Help ensure measurements like temperature, pressure and vibration remain consistent and within expected ranges by defining and applying standardized data quality rules across the enterprise.
- **Monitors Quality at Scale:** Proactively fix issues at the source before they corrupt your digital twins’ insights by continuously tracking data quality scores with intuitive dashboards.

*This gives the pharmaceutical manufacturer confidence that every temperature reading that feeds their bioreactor twin is automatically validated in real-time, protecting product quality and preventing costly batch failures.*

### 4. Govern the Entire Data Lifecycle with Cloud Data Governance and Catalog

Data this valuable requires robust protection and control. With **Cloud Data Governance and Catalog (CDGC)**, you can map the complete lineage of your data, understand its context and enforce access policies across the entire ecosystem. This provides the confidence to scale securely by using CLAIRE to:

- **Automate Data Discovery and Classification:** Automatically scan, catalog and apply AI-driven classification to sensitive data across your entire data estate – from on-premises databases to cloud data lakes.
- **Visualize End-to-End Lineage:** Generate a detailed, graphical map showing not just technical data lineage but also AI-inferred data relationships and business glossary associations, which is essential for auditability and root-cause analysis.
- **Define and Enforce Policies:** Implement data access policies that ensure only authorized users and systems can view or interact with sensitive operational data, minimizing business risk.

*The public utility can now instantly provide auditors with a complete data lineage report for any sensor reading, ensuring full compliance and demonstrating trustworthy operations.*

Chapter 3

# The IT Blueprint: A Modern Data Architecture for Success (continued)

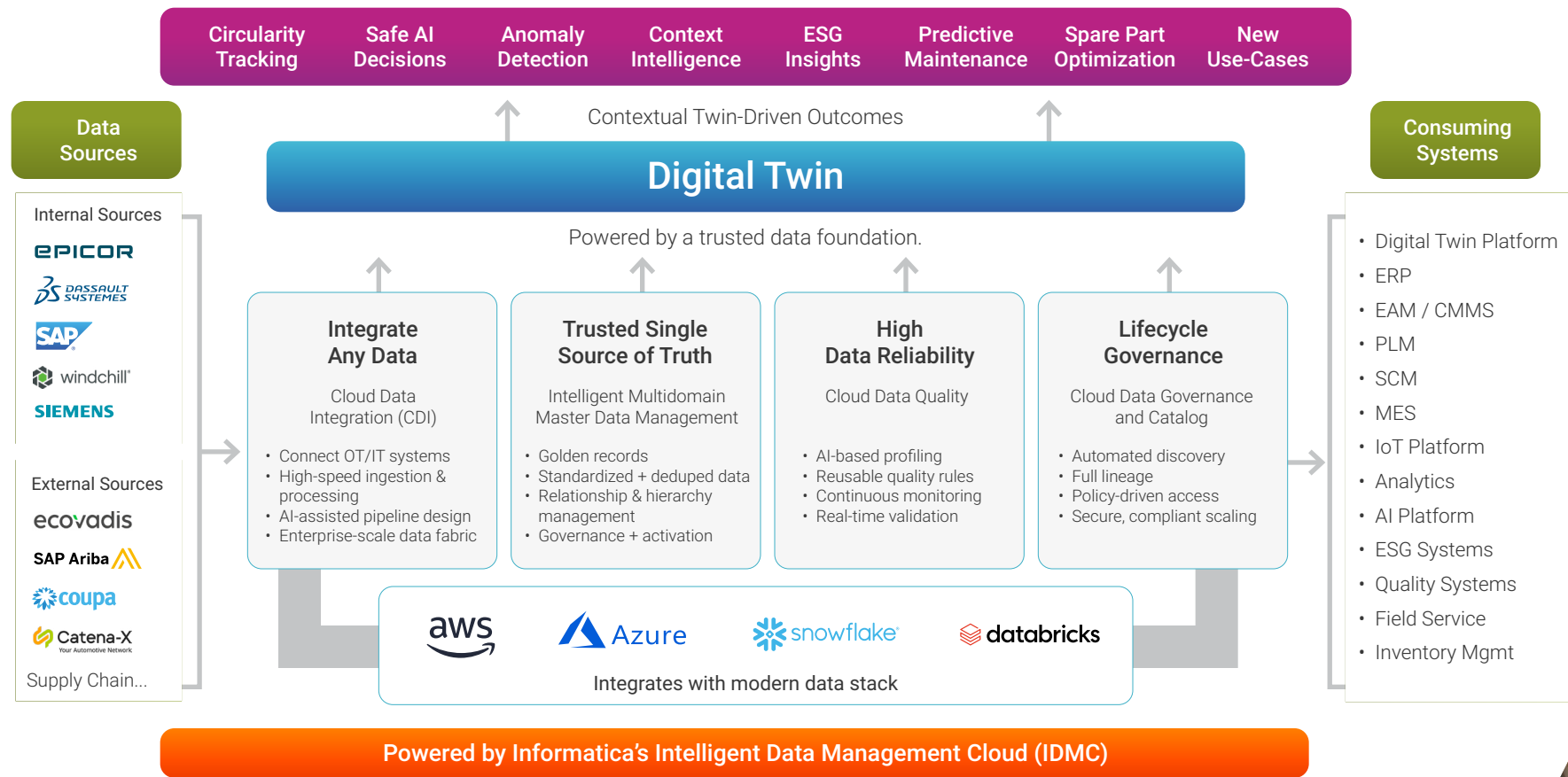


Figure 3. The digital twin architecture based on a trusted data foundation

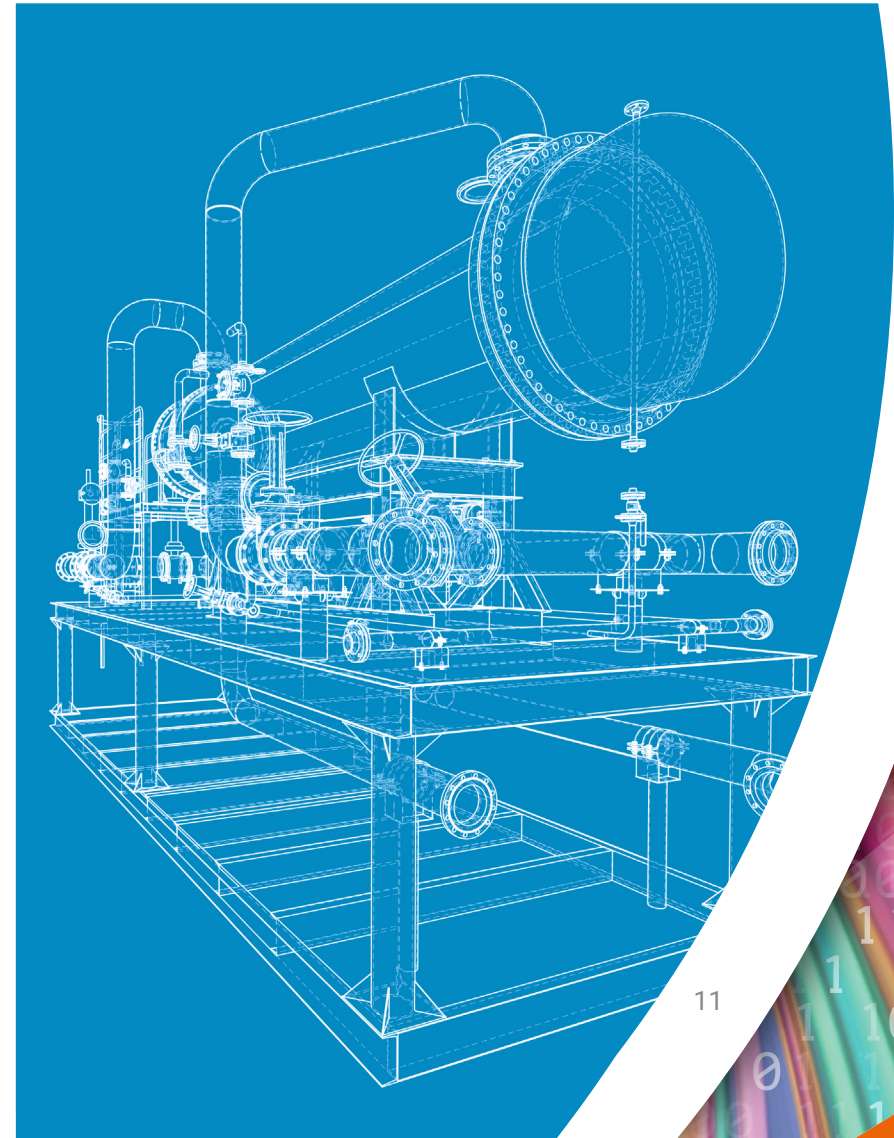
## Chapter 3

# The IT Blueprint: A Modern Data Architecture for Success (continued)

Together, these four pillars form the unshakable foundation for your digital twin. This isn't about ripping and replacing your existing technology. This blueprint is designed to work within your modern data stack, integrating seamlessly with partners like AWS, Azure, Snowflake and Databricks.

### The Blueprint at a Glance: A Four-Part Foundation

1. **Integrate:** Connect any data source (OT and IT) without custom code.
2. **Master:** Create a single, trusted 360-degree view of every asset.
3. **Cleanse:** Ensure data is complete and accurate before it feeds the twin.
4. **Govern:** Provide a secure, auditable and compliant data lifecycle.



## Chapter 4

# The Business Payoff: From Blueprint to Bottom-Line Impact

**Building this digital twin blueprint isn't just a technical achievement; it's a journey that delivers increasing business value at every stage. A solid data foundation is a direct driver of business value.**

By implementing this IT blueprint, you enable the business to move from: crawling (reactive maintenance) to walking (proactive optimization) and finally to running (predictive, autonomous operations).

Here are the specific, high-value use cases you unlock with a foundation of trusted asset data:



### Spotlight: Signal vs. Decision

Without a mastered data context, a prediction is just guesswork. Consider this common scenario:

#### Without Context:

- A vibration alert is triggered on "Motor 12."
- The Asset ID is unclear across different systems.
- There is no easily accessible maintenance history.
- The wrong alert threshold is applied because the specific model/version is unknown.
- A technician is dispatched with incomplete information.

**Outcome:** Downtime increases, costs rise and trust in the system drops.

- **Predictive Maintenance:** Combine real-time data with service history, criticality and component age to accurately predict failures. You give the business the power to avoid unplanned downtime by acting before a breakdown occurs.
- **Anomaly Detection:** AI is excellent at flagging deviations from expected behavior, but master data is what defines "normal." Trusted specs, tolerances and operating conditions from your MDM system provide the context needed to accurately identify anomalies.

#### With an MDM Context Layer:

- The alert is instantly linked to the correct, unique asset instance.
- The motor's exact location, production line and operational dependencies are known.
- The full service history and warranty context are immediately available.
- The correct spare parts and certified contractor are assigned automatically.
- A work order is generated with all necessary information.

**Outcome:** The issue is resolved before failure, preventing downtime and maximizing efficiency.

## Chapter 4

# The Business Payoff: From Blueprint to Bottom-Line Impact (continued)

- **Intelligent Prioritization of Alerts:** Not all alarms are equal. MDM provides the criticality, business impact and location context needed to automatically rank alerts, ensuring the most critical issues are escalated to the right teams immediately.
- **Spare Parts Optimization:** Link assets directly to valid spare parts, current stock levels and preferred suppliers. This reduces maintenance response times and eliminates costly errors from ordering wrong or outdated components.
- **ESG Reporting and Circularity Tracking:** Seamlessly pull material composition, energy class, CO2 footprint and location-specific ESG data into the digital twin. This automates and simplifies sustainability audits and ensures compliance with emerging EU regulations.
- **AI Agent Decision Support:** For AI agents to make safe, autonomous decisions, they require structure and traceability. The MDM foundation ensures the digital twin feeds clean, validated and governed data into AI logic, enabling trustworthy automation.



### Spotlight: Inventory vs. Insights

Context connects assets, parts and supply decisions, turning inventory into a strategic advantage.

#### Without Context:

- The same part is listed under multiple names.
- There is no link between an asset and its compatible components.
- Overstocking “just in case” is common practice.
- Critical parts are missing when needed and wrong parts are dispatched.

**Outcome:** High working capital is tied up in inventory and repairs are delayed.

#### With an MDM Context Layer:

- A single, governed catalog of master part data is established.
- Asset-to-part compatibility relationships are mastered.
- Usage patterns are tied to the asset’s lifecycle stage, enabling predictive demand.
- The correct part is shipped to the right site, every time.

**Outcome:** Lower inventory costs and faster, more reliable repairs.

# Your Role as the Digital Twin Hero

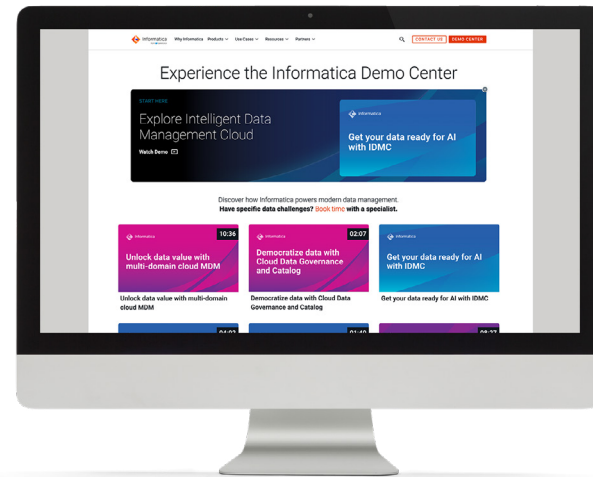
**The message is clear: the success of any digital twin initiative hinges on the quality, governance and accessibility of its data foundation. Without it, even the most ambitious projects are destined to remain stuck in the pilot phase.**

By taking ownership of this data architecture, you are doing far more than just supporting another business initiative; you are building the central nervous system for the real-time, intelligent enterprise of the future. You are the strategic hero who changes the conversation — transforming IT from a cost center into a powerful engine for business value.

Now, it's time to put this blueprint into practice.

**See the Blueprint in Action.** [Request a personalized demo](#) to see how Informatica's Intelligent Data Management Cloud (IDMC) can power your digital twin initiative.

**Explore More.** [Visit our resource library](#) to find complementary content, including in-depth webinars and real-world customer stories.



# About Us

## About Informatica

Informatica from Salesforce is a leader in AI-powered enterprise cloud data management. Its Intelligent Data Management Cloud (IDMC) platform enables organizations to connect, manage and unify AI-ready data across the enterprise. With capabilities spanning data cataloging, integration, governance, quality, privacy, metadata management and master data management, Informatica supports a broad partner ecosystem and helps customers unlock the full value of their data and AI initiatives.

## About Salesforce

Salesforce is the #1 AI CRM, empowering companies to connect with their customers in a whole new way through the power of artificial intelligence, data, and trust. For more information about Salesforce (NYSE: CRM), visit: [www.salesforce.com](http://www.salesforce.com).

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